Space Weather Forecast

Issued on Wednesday, 20 July 2022 at 13:12 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: G1/Minor Storms likely with coronal hole fast wind arrivals, most likely day 3 (22nd). Chance of Moderate flares (R1-R2 Radio blackouts).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low over the last 24 hours, with only stable and inactive sunspots on the visible disc and low level Common-class flares, although some growth in small sunspots has been observed in the northeast quadrant. No Earth-directed CMEs (coronal mass ejections) have been observed on available imagery.

Solar Wind / Geomagnetic Activity: The solar wind as observed at L1 was indicative of a CME arrivalSolar wind speeds were slightly elevated, peaking at 480km/s at 19/1500UTC, with a steady declining trend. The magnetic field strength was moderate, before gradually declining. The all important north-south component was persistently negative at the start of the period, becoming mostly positive from 19/2130UTC. This magnetic structure was indicative of a passing CME. Geomagnetic activity was Unsettled to Active with one G1/Minor Storm interval (19/1200-1500 UTC), recently becoming Quiet.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is forecast to be Low, with a chance of rising to Moderate from any Moderate flares that occur due to the number of sunspot regions on the visible disc.

Solar Wind / Geomagnetic Activity: There are no Earth-directed CMEs. Current elevated solar winds are expected to ease day 1 (20th) and day 2 (21st) before a further enhancement is possible late day 2 or more likely day 3 (22nd). This is due to the arrival of fast winds from two large coronal holes on the Sun. Geomagnetic activity will be initially Quiet, with a slight chance of isolated Unsettled intervals late on day 1 (20th). Increasing to Unsettled to Active with isolated G1/Minor Storm intervals likely later day 2 or day 3 (21st or 22nd) due to the fast wind arrivals. Activity easing back to Quiet to Unsettled day 4 (23rd).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) may increase due to any flares that occur, however there is only a very slight chance of reaching the level of a solar radiation storm.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	5	30	60	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	25	25	20	20
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	2	2	2	2
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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